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## Translation of WO 01/25575 (PCT/EP00/09633)

Device for Actuating an Electronic Locking System and/or a Lock  
Integrated in a Door, a Flap or the Like, Especially in a Motor  
Vehicle

+ The invention relates to a device of the kind mentioned in the preamble of claim 1. The handle arranged on the exterior side of the door has generally two projections which penetrate openings in the door and project from the back side of the door panel. One projection can comprise a bearing for a pivot support of the handle on a bearing block fixedly connected on the back side of the door, wherein the bearing block has complementary counter bearings. This first projection therefore serves as a bearing projection of the handle.

The second projection of the handle serves primarily as a further securing means of the handle on the door. The second projection can also be configured such that, upon actuation of the handle, it cooperates with lock members on the inner side of the door. Accordingly, by means of this working projection a lock can be actuated after actuation of the handle. Mounting of the handle is realized from the exterior side of the door where the bearing projection as well as the working projection are inserted through the respective openings in the door until they are in the prescribed position on the inner side of the door in the area of the bearing block, on the one hand, and in the area of the lock members, on the other hand. In order to achieve this, a certain movement sequence of the handle is required during the mounting movement through the door opening.

In a device of the aforementioned kind known from DE 196 33 894 A1, the handle comprises electronic components in the handle interior which are connected by an electrical line with an electrical coupling provided on the end of the bearing projection. In the mounted state of the door handle, the electrical coupling is connected by means of an electrical counter coupling part and an electrical control line connected thereto with an electronic device of the vehicle. In this known door handle, the bearings of the handle on the bearing projection are arranged in immediate vicinity of the electrical coupling part. When mounting the handle according to DE 196 33 894 A1, the electrical coupling part within the bearing projection is inserted into an electrical counter coupling part which is provided on a support already mounted on the door.

The disadvantage of the device of 196 33 894 A1 is that it is relatively complex with regard to manufacturing technology and that special counter coupling parts must be employed.

~<sup>19</sup> It is an object of the present invention to develop a reliable device of the kind mentioned in the preamble of claim 1 which avoids the aforementioned disadvantages. This is achieved according to the invention by the measures defined in the characterizing portion of claim 1 which have the following special meaning.

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The special feature of the present invention resides in that the electrical coupling part, which is arranged on the bearing projection of the door handle, is arranged pivotably on it and that the electrical counter coupling part, which must be inserted during

mounting of the door handle on the door into the electrical coupling part, is also arranged pivotably at least on a frame part of a support provided on the door. Advantageously, the electrical coupling part can be detachably secured in an initial position on the bearing projection at the beginning of mounting of the door handle on the door so that the electrical coupling part cannot pivot away upon insertion into the electrical counter coupling part.

The electrical counter coupling part can have a shaped means which prevents pivoting of the electrical counter coupling part in the initial position of mounting. This could be, for example, a nose which is positioned within the opening area of the electrical counter coupling part.

Advantageously, the present invention can be produced relatively simply with regard to manufacturing technology. In comparison to normal door handles or coupling part arranged thereat only one bearing must be provided on the bearing projection of the door handle. The coupling part can be a commercially available electrical coupling part which must only be expanded by a bearing. Also, the employed counter coupling part can be a commercially available counter coupling part which is only modified.

In the mounted state the present electrical plug-in coupling has the advantage that the electrical coupling parts cannot move relative to one another upon a pivot movement of the handle. Accordingly, no wear of the electrical plug contact can result.

Moreover, the present invention enables a simple and simultaneous mounting of the electrical plug-in coupling and the handle on the door.

In an advantageous embodiment of the invention, the electrical counter coupling part is arranged on the support part by means of a pivot lever which is rotatably supported twofold. One of these bearings this is preferably lockable in one position so that in this position only one of the bearings is pivotable. This ensures a simple insertion of the electrical coupling part into the electrical counter coupling part upon mounting of the door handle on the door.

Further advantages and measures of the invention result from the dependent claims, the following description, and the drawings. In the drawings the invention is illustrated with one embodiment. It is shown in:

- Fig. 1      schematically a longitudinal section of the device fastened on the door of a vehicle, wherein a first mounting position of the handle correlated therewith is illustrated;
- Fig. 2      schematically an enlarged detail of Fig. 1 according to the dash-dotted rectangle II of Fig. 1;
- Fig. 3      schematically a longitudinal section corresponding to Fig. 1, with a second mounting position of the

device according to the invention illustrated therein;

- Fig. 4      schematically a section corresponding to Fig. 1 with a third mounting position of the device according to the invention illustrated therein;
- Fig. 5      schematically a longitudinal section corresponding to Fig. 1 with a fourth mounting position of the device according to the invention illustrated therein;
- Fig. 6      schematically a longitudinal section corresponding to Fig. 1 with a fifth mounting position of the device according to the invention illustrated therein;
- Fig. 7      schematically a longitudinal section corresponding to Fig. 1 with a final mounting position of the device according to the invention illustrated therein;
- Fig. 8      schematically a section according to the section line VIII-VIII of Fig. 6;
- Fig. 9      schematically a section according to the section line IX-IX of Fig. 2.

In Figs. 1, 2 and 9 the device according to the invention is illustrated in a first mounting position. On the backside 42 of a

door 40 a support is mounted which is secured in its position by means of one or more screws 29 on the door panel. In the door 40 several openings 44, 45, 46 are provided which are penetrated, during and after mounting of the door handle 10, by its forward and rearward projections 11, 12.

The door handle 10 has a handle interior 19 in which electronic components are positioned which cooperate with an electronic control device of the locking system or the like. At the leading end of the door handle a projection 11 is formed on the door handle 10 which is embodied as a bearing projection. On this bearing projection 11 a bearing 51 is provided which in the mounted state of the door handle 10 cooperates with a bearing 52 of the support part 20. The support part 20 has for this purpose a bearing block 21 on which the counter bearing 52 is arranged. In the illustrated embodiment, the door handle is pivotably secured on the bearings 51, 52 in the mounted state. An electrical coupling part 31 of an electrical plug-in connection 30 is also arranged on the bearing projection 11. The electrical coupling part 31 is pivotably supported on the bearing projection 11 by means of a pivot bearing 71, which is comprised of a bearing hole 17 provided in the bearing projection 11 and a rotary bearing axle 36 provided on the electrical coupling part 31. The rotary bearing axle 36 is connected by a U-shaped bearing projection 35 with the electrical coupling part 31. The electrical coupling part has moreover an engagement point 37 which can be engaged by securing means 31 of the bearing projection 11. In Figs. 1, 2 and 9 a first mounting position of the door handle 10 is illustrated in which the electrical coupling part 31 is in this securing position 77.

The electrical coupling part 31 is electrically connected by a connecting line 18 with electronic components in the handle interior 19.

On the support part 22 securing stays 20' are arranged on which the electrical counter coupling part 32 of the electrical plug connection 30 is secured pivotably and slidably.

The detailed configuration and the arrangement of the electrical counter coupling part 32 on the securing stay 20' of the support part 20 can be seen in Figs. 2 and 8. In the area of the door opening 44, through which the bearing projection 11 of the door handle 11 is guided through the door 40, a securing stay 20' as an extension of the support part 20 is formed on the support part 20 on opposed sides of the door opening 44 parallel to the direction of extension of the handle. These securing stays 20' are provided with a bearing eye 28 and a guide slot 27 formed thereon. The bearing eye 28 serves for pivoting a bearing pin 24 on a pivot lever 22. A rearward part of this bearing pin 24 on the pivot lever 22 is formed as a sliding block 26. The bearing pin 24 with the sliding block 26 can have two positions 75 and 76. In the first position of the bearing pin 24, the sliding block 26 is positioned in the guide slot 27 on the securing stay 20'. A pivot movement of the bearing 73 formed of the bearing eye 28 and the bearing pin 24 is not possible. In a second position 76 of the bearing pin 24 in the bearing eye 28, the sliding block 26 is moved out of the guide slot 27 and the bearing pin 24 is positioned entirely within the bearing eye 28 and is rotatable therein. The bearing 73 is now pivotable. On the pivot lever 22 a bearing eye 23 is arranged on its second pivot lever side in which the bearing

pin 39 of the electrical counter coupling part 32 is inserted. The bearing pin 39 and the bearing eye 23 from the bearing 74 on which the electrical counter coupling part 32 is pivotably arranged. The bearings 73 and 74 form together a double pivot bearing 72 defined by the pivot lever 22. On the electric counter coupling part 32 a supply and control line 38 is arranged via which the electrical counter coupling member 32 is connected to an electronic control.

Mounting of the device according to the invention is carried out in several movement steps. In Fig. 1 a first movement step of the assembly is illustrated. The door handle 10 is first inserted, corresponding to the direction of the insertion arrow 53, with its bearing projection 11 into the door opening 44 and, in this way, the electrical coupling part 31 is inserted, corresponding to the direction of arrow 60, into the electric counter coupling part 32. The bearing 74 is blocked during this process by the sliding block 26 which is positioned in the guide slot 27.

In Fig. 3 the position reached after this first mounting step is illustrated. The electrical coupling part 31 and the electrical counter coupling 32 form together the electrical plug-in connection 30 in which a contacting is achieved via the pin contacts 33 and the bushing contact 34 which are inserted into one another. The two coupling parts 31 and 32 are secured on one another by coupling means 31' and counter coupling means 32'. This connection is detachable for repair purposes or the like.

Fig. 3 illustrates a further mounting direction of the door handle 10. Corresponding to the illustrated rotational movement in the direction of rotation arrow 54, the projection/working projection



12 of the door handle 10 is pivoted into the door opening 45 of the door 40 from the exterior side 41. In this connection, the bearing 71 is moved in the rotational direction 54', and the securing means 13 is released in the direction of arrow 54'' from the engagement point 37 of the electrical coupling part 31. The electrical coupling part 31 and thus the electrical plug-in connection 30 are now in the release position 78.

At the end of this mounting movement, the leading end of the working projection 10 of the door handle 10 is positioned shortly behind the door opening 45, as illustrated in Fig. 4. Starting from this position, the door handle 10 is further pivoted in the direction of rotation arrow 55. In this connection, the rearward surface 14 of the bearing projection 11 rests against the stop 50 of the support part 20 and becomes the elbow of an elbow lever. The bearing projection 11 is pivoted in this connection in the direction of arrow 55'' on the stop 50. As a result of this pivot movement, a lateral movement 55' is exerted onto the bearing pin 24 and its sliding block 26 which thus moves out of the guide slot 27.

In Fig. 5 the position of the door handle 10 on the door 40 after completion of mounting movement 55 is illustrated. It is shown that the bearing pin 24 is now completely located within the bearing eye 28 and is thus also rotatable. In Fig. 5 moreover the further mounting movement of the door handle 10 is illustrated. Corresponding to arrow 56, the door handle 10 is moved farther into the door. This results in a rotation on the bearing 71 corresponding to the rotational direction 56''. The rotation of the bearing 73 is indicated by arrow 56'. Corresponding to the eccentricity of the pivot lever 22, its second bearing with the

bearing eye 23 moves upwardly. The bearing 74 compensates the movement of the bearing 73.

In Fig. 6 the end position of the mounting movement 56 is illustrated. The handle is now positioned against the door 40.

The door handle 10 is now moved corresponding to the mounting movement 54 along the depression 43 of the door 40 in the direction of arrow 57. This results in a rotation 57' on the bearing 73. Corresponding to the eccentricity of the pivot lever 22, its second bearing with the bearing eye 23 moves again downwardly. The bearings 71, 74 again provide a flowing pivot movement. At the end of this last mounting movement, the bearing eye 15 has moved about the counter bearing 25 and embraces it. The working projection 12 of the door handle 10 moves behind the locking member 16 with which, by means of the door handle 10, a lock can be actuated. For further securing of the door handle 10, the cylinder column 61 and the lock cylinder 62 must be inserted into the door opening 46 so that a return movement of the door handle 10 counter to the mounting movement 57 is no longer possible.

It should be noted in this context that instead of the cylinder column 61 and the lock cylinder 62 also a blind cap can be inserted as is the case, for example, in fully automated locking systems which require no mechanical adjusting movement. By means of the illustrated control member 63 the locking system/lock can be secured or released by means of actuation of the lock cylinder 62.

It should be also noted that the present invention is not limited to the illustrated embodiment. Other embodiments are also

conceivable. For example, instead of the double pivot bearing 72 also a guide slot can be provided on the securing stay 20' on which the electrical counter coupling part 32 is directly supported (not illustrated in the drawing).

Also, on the electrical counter coupling part 32 in the direction of the working projection 12 a further nose can be formed which secures the electrical counter coupling part 32 in position during insertion of the electrical coupling part (not illustrated in the drawing).

Instead of the sliding block 26 and the guide slot 27 other means for securing a bearing can also be provided.

## List of Reference Numerals

10	handle (rest position)
11	projection/bearing projection
12	projection/working projection
13	securing means
14	rearward surface of 11
15	bearing eye of 11
16	locking member (rest position)
17	bearing hole in 11
18	connecting line for 31
19	handle interior of 10
20	support part
20'	securing stay of 20
21	stationary bearing block of 20
22	pivot lever
23	bearing eye in 22
24	bearing pin on 22
25	counter bearing to 15
26	sliding block on 22
27	guide slot
28	bearing eye in 20'
29	screw in 20
30	electrical plug-in connection
31	electrical coupling part of 30
31'	coupling means
32	electrical counter coupling part of 30 (rest position)
32'	counter coupling means
33	pin contact in 32
34	bushing contact in 31

35 U-shaped bearing projection  
36 rotary bearing axle of 35  
37 engagement point for 13  
38 supply and control line for 32  
39 bearing pin on 32  
40 door, door panel  
41 exterior side of 40  
42 inner side of 40  
43 depression in 40  
44 first door opening for 11  
45 second door opening for 12  
46 third door opening for 61

50 stop  
51 bearing on 11  
52 counter bearing on 21, 20  
53 insertion arrow (mounting movement)  
54 rotation arrow (mounting movement)  
54' rotational direction bearing 71  
54'' release movement of 13  
55 rotation arrow (mounting movement)  
55' retraction movement of 26  
55'' rotational movement on stop 50  
56 arrow (mounting movement)  
56' rotational direction, bearing 73  
56'' rotational direction, bearing 71  
57 last pushing movement phase (mounting movement)  
57' rotational movement on the bearing 73

60 arrow for insertion direction of 31 into 32

- 61 cylinder column
- 62 lock cylinder of 61
- 63 control member of 62
  
- 71 pivot bearing
- 72 double pivot bearing
- 73 bearing
- 74 bearing
- 75 first position of bearing pin 24
- 76 second position of bearing pin 24
- 77 securing position of the electrical coupling part (31)
- 78 release position of the electrical coupling part (31)